

SERIOUS GAME FOR FIRST AID

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ABSTRAK

Asas pertolongan cemas ialah satu pengetahuan yang mesti diketahui oleh setiap manusia. Asas pertolongan cemas boleh menolong mereka yang berada di dalam keadaan kecemasan dan ianya boleh mengelak kecederaan kecil daripada menjadi besar dan mengelak kecederaan besar dari menjadi lebih teruk. Kemahiran ini boleh memberi perbezaan dalam menolong menyelamatkan nyawa orang. Oleh itu, tesis ini memberi tumpuan kepada perkembangan aplikasi mainan yang serius untuk asas pertolongan cemas dimana pemain boleh memilih antara dua mod main iaitu tutorial dan tugas. Mod tutorial ialah satu modul yang membenarkan pemain diberi panduan untuk membina kemahiran baharu. Mod tugas ialah satu modul yang membenarkan pemain untuk menguji kemahiran baharu di dalam satu kekangan masa. Aplikasi mainan ini menggunakan mod ulangan yang membenarkan pemain meningati kemahiran dengan lebih baik.

ABSTRACT

Basic first aid is a must know knowledge that has to be integrate into every human being. Basic first aid can helps those in an emergency and prevent small injuries from becoming big and big injuries from becoming worse. The skill can make a different in saving people life. In order to master this first aid skill, a good basic of what is first aid and what to know first is important. Thus, this thesis is focusing on the development of serious game application for basic first aid in order to help general public learning basic first aid in the most fun way. The game is develops using Unity software. This module implements fun approaches for serious game application where player can choose between two game mode which are tutorial and task. Tutorial mode is the module that allows player to be guide to develop new skills. Task mode is the module that allows player to test new skills within a time constraint. The game application applies repetitive mode that will allow player to memorize the skills better.

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LIST OF ABBREVIATIONS

2D	2-Dimension
3D	3-Dimension
G/P/S	Game/Purpose/Scope
AI	Artificial intelligence
QAS	Queensland Ambulance Service
CV	Curriculum vitae
OS	Operating system
VR	Virtual reality
RAD	Rapid application development
UML	Unified model language
UI	User interface
GUI	Graphic user interface
NPC	Non-playable character

CHAPTER 1

INTRODUCTION

1.1 Introduction

First aid is the initial care provided to someone who has suddenly fallen ill, or who been injured, until more advanced care is provided or the person recovers. There are many situations where we need to provide first aid to others. Being equipped with first aid skills could be the difference between life and death. In an emergency medical situation, knowledge is power.

Emma Hammett, an expert author and speaker on First Aid, Health & Accident Prevention, founder of First Aid Life in 2007, said that during her nursing career, she was inspired as she repeatedly saw the difference first aid could make to someone's prognosis. She was looking after a little boy that was so badly burnt he needed skin grafts during her worked in the Burns Unit. No need for him to admit to the hospital had his family equipped with basic First Aid skills. The situation motivated her to establish First Aid Life in 2007. This accident opened her eyes to the importance of accident prevention, management and support following an accident and the need to empower more people with the skills and confidence to know how to help in those first vital seconds.

Given this scenario, there is a crucial need to educate the public about questions related to first aid, especially children, who represent the future of society. In this context, we can achieve a fun but educational learning environment through games (serious games).

According to Michael and Chen (2007), serious games, as distinct from leisure games, provide users and players with opportunities to explore non-leisure application using games and immersive world application for education and training, as well as

supporting business and medical uses. In other words, a serious game is a game which education is the primary goal; integrate with entertainment to make it more fun and interactive. It teaches the player new adaptive skills that they can apply from the game format to a real life experience.

The purpose of this study, therefore, is to study the design and development of serious game on basic first aid. The serious games, called “The Healer: First Aid”, will be integrated with ways of letting the player experience different scenarios of giving first aid to those that needed.

1.2 Problem Statement

The first problem is that not many people own a first aid kit. Even if they own one, only some of them know the contents of the kit and how to properly to use the items inside. The lack of knowledge about the first aid kit and its content can cause a very huge delay when they want to administer basic first aid on someone that is in need.

The second problem is that most people do not know how to treat injuries using proper first aid skills. Not knowing how to properly treat even a mere small wound can cause serious infection later on.

The third problem is the lack of confidence in helping people in need. In an emergency, people often fail to help someone in need because sometime they are faced with a crisis; often are overcome by fear and anxiety and may panic. They fear that they may do the wrong thing that can cause further injury or they are afraid that they may harm their selves. These reactions can also result in a delay in a casualty receiving the treatment or the quality of the treatment being compromised.

This is why a new method is needed to approach all of these problems. Using a serious game technology in first aid will improve public knowledge, especially young teenagers on basic first aid. They can learn how to perform a simple procedure to keep a person breathing just from the simulation and various storyline in the serious game. They also can learn how to administer basic treatment to stop a person from bleeding by applying the knowledge they had gain through the game. The game also can improve their self-confidence to help someone, knowing that they have the skills to help save a life and also give them the sense of empowerment.

1.3 Objectives

Based on the above problem statements, the objectives of the project are:

- i. To study the implementation of serious game for first aid using 2D game designs.
- ii. To design and develop a serious game application using UNITY and 2D game design technique.
- iii. To validate effectiveness of develops serious games towards player through gameplay.

1.4 Scopes

Target User:

- i. The target user is expected to have a little to none knowledge about basic first aid.

Platform:

- i. PC-based game
- ii. Allow online and offline game connection

Technology:

- i. 2D technology will be used to help player visualize the game situation

First Aid Scope:

- i. Burn: What is burn, three levels of burn, complication, preventions and the outlook of burns.
- ii. Strains and Sprains: The difference between strains and sprains symptoms, causes, how to treat them and preventions.
- iii. Bleeding: Cut and grazes, nose bleeding and severe bleeding and bleeding emergencies such as shock

REFERENCES

- Alvarez, J. A., Rampnoux, O., Jessel, J.-P., & Methel, G. (2007). Serious Game: Just a question of posture? *Artificial and Ambient Intelligence, AISB*, 1(March 2014), 420-423.
- Alvarez, J., & Damien, d. (2011). *An Introduction to Serious game Definitions and concepts. Proceedings of the Serious Games & Simulations Workshop* (Vol. 2).
- Micheal, D. R., & Chen, S. L. (2005). Serious Games: games That Educate, Train, and Inform. *Education*. <https://doi.org/10.1021/la104669k>
- Research – First-Aid Game. (2012). Retrieved from <http://first-aid-game.e-ucm.es/research>
- Ricciardi, F., & De Paolis, L. T. (2014). A Comprehensive Review of Serious Games IN Health Professions. *International Journal of Computer Games Technology*, 2014. <https://doi.org/10.1155/2014/787968>
- Sawyer, B., & Smith, P. (2008). Serious Game Technology. In *Health (San Francisco)* (pp. 1-54). Retrieved from <https://thedigitalentertainmentalliance.files.wordpress.com/2011/08/serious-games-taxonomy.pdf>
- SJA – Rescue Run. (2012). Retrieved from <https://rescuerun.sja.org.uk/>
- Wattanasoontorn, V., Boada, I., Garcia, R., & Sbert, M. (2013). Serious games for health. *Entertainment Computing*, 4(4), 231-247. <https://doi.org/10.1016/j.entcom.2013.09002>
- Zyda, M. (2005). From visual simulation to virtual reality to games. *USC Information Sciences Institute*, 38(9), 25-32. <https://doi.org/10.1109/MC.2005.297>